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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/748,520	12/30/2003	Irene Spitsberg	129968	7282
49305	7590	04/07/2006	EXAMINER	
JAGTIANI + GUTTAG 10363-A DEMOCRACY LANE FAIRFAX, VA 22030			IVEY, ELIZABETH D	
			ART UNIT	PAPER NUMBER
			1775	

DATE MAILED: 04/07/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

**Office Action Summary**

Application No.

10/748,520

Applicant(s)

SPITSBERG ET AL.

Examiner

Elizabeth Ivey

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 10 February 2006.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1,2,6-12,16-25 and 28 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1,2,6-12,16-25 and 28 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 30 December 2003 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- |   |   |
|---|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892)                        | 4) <input type="checkbox"/> Interview Summary (PTO-413)                     |
| 2) <input type="checkbox"/> Notice of Draftperson's Patent Drawing Review (PTO-948)     | Paper No(s)/Mail Date. _____  |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| Paper No(s)/Mail Date _____   | 6) <input type="checkbox"/> Other: _____                                    |

## DETAILED ACTION

### *Claim Rejections - 35 USC § 112*

The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

Claims 1-2, 6-12, 16-25 and 28 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Regarding claims 1-2, 6-12, 16-25 and 28, applicant recites, in independent claims 1, 8 and 21, a composition with at least 91 mol% zirconia and about 5-8 mol% of a stabilizer indicating no other components. As stated, a composition having 91 mol% zirconia and any point of the range in mol% of stabilizer would create a composition with less than 100 mol% in total making the independent claims and all claims that depend to said independent claims indefinite.

Additionally, independent claims 1, 8 and 21 claim the stabilizer to comprise 4-6 mol% yttria and 0.8-2.0 mol% lanthana. As written, said claims are inconsistent with the specification making it unclear as to whether the yttria and lanthana contents comprise 4-6 mol% and 0.8-2 mol% respectively of the ceramic composition or of the stabilizer itself thereby rendering said claims and all claims depending to said claims indefinite. For purposes of furthering examination, the examiner interprets the mol percentages of the yttria and lanthana to be percentages of the ceramic composition and not of the stabilizer. Clarification of the claims is required.

***Claim Rejections - 35 USC § 102***

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(a) the invention was known or used by others in this country, or patented or described in a printed publication in this or a foreign country, before the invention thereof by the applicant for a patent.

Claims 1-2, 6-12, 16-18, 20-25 and 28 are rejected under 35 U.S.C. 102(a) as being anticipated by U.S. Patent Application 20030224200 A1 to Bruce.

Regarding claims 1-2 and 6-7, the examiner interprets mol percentages claimed by applicant to be mol percentages of the ceramic composition as indicated above. Bruce discloses a ceramic thermal barrier coating of yttria stabilized zirconia having 1-10wt% yttria and 0.1 to 5 wt% lanthana creating a composition which when calculated into mol% readily overlaps the ranges of at least about 91 and between about 92-95 mol% zirconia, about 4-6 mol% or about yttria and about .8-2 mol% lanthana with a total stabilizer component of about 5-8 mol% and where the mol% lanthana ratio to total stabilizing component is from about 0.15 to about 0.35 or about 0.2 to about .3 (page 3 paragraph [0023]) The overlapping ranges create a composition of from between about 87-91 wt% zirconia, 7-9.5 wt% Y<sub>2</sub>O<sub>3</sub> and 2.2-4.5 wt% La<sub>2</sub>O<sub>3</sub>.

Regarding claims 8, 12, 16, 18, 21, 24, 25, and 28 the examiner interprets mol percentages claimed by applicant to be mol percentages of the ceramic composition as indicated above. Bruce discloses a ceramic thermal barrier coating deposited by physical vapor deposition on a superalloy engine component such as a blade (airfoil), the thermal barrier coating

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comprising yttria stabilized zirconia having 1-10wt% yttria and 0.1 to 4wt% lanthana creating a composition which when calculated into mol% readily overlaps the ranges of at least about 91 mol% zirconia and about 92-95 mol% zirconia, about 4-6 mol% yttria and about .8-2 mol% lanthana with a total stabilizer component of about 5-8 and about 5.5-6.5 mol% and where the mol%ratio of lanthana to total stabilizing component is from about 0.15 to about 0.35 and about .2 to about .3 (page 2 paragraphs [0010], [0015] and [0016] and page 3 paragraph [0023]). The overlapping ranges create a composition of from between about 87-91 wt% zirconia, 7-9.5 wt% Y<sub>2</sub>O<sub>3</sub> and 2.2-4.5 wt% La<sub>2</sub>O<sub>3</sub>.

Regarding claims 9 and 22, Bruce discloses a bond coating overlying the substrate and adjacent to the thermal barrier coating (page 2 paragraph [0016] and figure 2).

Regarding claims 10, 20 and 23 Bruce discloses a (strain tolerant) columnar thermal barrier coating with a thickness of 75-300 micrometers and 110-120 microns overlapping 1-100mils and 3-15 mils page 3 paragraphs [0019] and [0023]).

### ***Claim Rejections - 35 USC § 103***

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person

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having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

Claims 1-2, 6-12, 16-25 and 28 are rejected under 35 U.S.C. 103(a) as being unpatentable over U.S. Patent Application 20030224200 A1 to Bruce.

Regarding claims 1-2, 6-12, 16-18, 20-25 and 28, the examiner interprets mol percentages claimed by applicant to be mol percentages of the ceramic composition as indicated above. Bruce discloses a ceramic thermal barrier coating deposited by physical vapor deposition on a superalloy engine component such as a blade (airfoil), the thermal barrier coating comprising yttria stabilized zirconia having 1-10wt% yttria and 0.1 to 4wt% lanthana creating a composition which when calculated into mol% readily overlaps the ranges of at least about 91 mol% zirconia and about 92-95 mol% zirconia, about 4-6 mol% yttria and about .8-2 mol% lanthana with a total stabilizer component of about 5-8 and about 5.5-6.5 mol% and where the mol%ratio of lanthana to total stabilizing component is from about 0.15 to about 0.35 and about .2 to about .3 (page 2 paragraphs [0010], [0015] and [0016] and page 3 paragraph [0023]). The overlapping ranges create a composition of from between about 87-91 wt% zirconia, 7-9.5 wt% Y2O3 and 2.2-4.5 wt% La2O3. Bruce discloses a bond coating overlying the substrate and adjacent to the thermal barrier coating (page 2 paragraph [0016] and figure 2). Bruce discloses a

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(strain tolerant) columnar thermal barrier coating with a thickness of 75-300 micrometers and 110-120 microns overlapping 1-100mils and 3-15 mils page 3 paragraphs [0019] and [0023]). Although Bruce does not show express examples of compositions falling within the claimed ranges, Bruce does overlap the claimed ranges and discloses that the compositions are used to produce desirable thermal cycle fatigue lives and thermal conductivities, therefore it would have been obvious to a person having ordinary skill in the art at the time of the invention to have selected the overlapping portion of the ranges disclosed by the reference because overlapping ranges have been held to be a prima facie case of obviousness, *In re Malagari*, 182 USPQ 549. Additionally "The normal desire of scientists or artisans to improve upon what is already generally known provides the motivation to determine where in a disclosed set of percentage ranges is the optimum combination of percentages." *In re Hoeschele*, 406 F.2d 1403, 160 USPQ 809(CCPA 1969).

Regarding claim 19, Bruce discloses all of the limitations of claim 18. Although Bruce does not expressly disclose a turbine shroud with a thermal barrier coating thickness of 30-70 mils Bruce does disclose the thermal barrier coating a turbine shroud, said coating having an intended thickness sufficient to provide required thermal protection for the underlying substrate (page 2 paragraph [0017]). Therefore, it would have been obvious to a person having ordinary skill in the art at the time of the invention to adjust the thermal barrier coating thickness for the intended application, since it has been held that discovering an optimum value of a result

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effective variable involves only routine skill in the art. In re Boesch, 617 F.2d 272, 205 USPQ 215 (CCPA 1980).

### ***Response to Arguments***

Applicant's arguments filed March 10, 2006 have been fully considered but they are not persuasive.

Regarding applicant's argument that Bruce does not sufficiently disclose the specific claimed ranges of the composition based on the indication of a composition related to have greatest impact resistance, applicant has not shown that the compositions are not disclosed. Although Bruce discloses impact resistance as important and discloses particular compositions for greatest impact resistance, the fact that Bruce indicates a composition exhibiting greatest thermal impact resistance does not negate the disclosure of the ranges of zirconia, yttria and lanthana, which overlap the claimed ranges.

Additionally, regarding the obviousness of using the overlapping ranges, applicant has not shown that it would not be obvious to a person having ordinary skill in the art to have used the overlapping ranges. Bruce discloses, in addition to impact resistance, other important and desirable characteristics such as thermal cycle fatigue and thermal conductivities, which are affected by the thermal barrier coating composition. The disclosure of a range and important characteristics would make obvious the use of the overlapping ranges as indicated above.



***Conclusion***

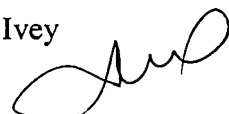
Any inquiry concerning this communication or earlier communications from the examiner should be directed to Elizabeth Ivey whose telephone number is (571) 272-8432. The examiner can normally be reached on 7:00- 4:30 M-Th and 7:00-3:30 alt. Fridays.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Jennifer McNeil can be reached on (571) 272-1540. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).



Elizabeth D. Ivey



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SUPERVISORY PATENT EXAMINER  
3/30/06